COLONY OF MAURITIUS

DEPARTMENT OF AGRICULTURE

Twenty-third Annual Report

of the

Sugarcane Research Station

1952

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SUGARCANE RESEARCH STATION, MAURITIUS
23RD ANNUAL REPORT, 1952

TABLE OF CONTENTS

	PAGE
Staff	i
Policy of the Station	ii
Introduction	1
Part I—Report on the Cane Breeding Division ...	8
Part II—Report on the Chemistry Division	15
Part III—Report on the Botany Division	22
Part IV—Report on the Extension Service Division ...	26

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Clerk ... . R. BISSESSUR

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The Chemist
The Botanist
The Plant Breeder

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Mr. G. P. Langlois
Mr. P. Halais

Nominated by the Sugar Industry Reserve Fund Committee :

Mr. Pierre de Sornay, *Chevalier de la Légion d'Honneur*
Mr. F. North Coombes

POLICY OF THE STATION

The policy of the Sugarcane Research Station is to improve the yield of sugar from every acre of land under cane and to extend the area capable of being planted in cane, in order to increase the total sugar output of the Colony.

The means by which this policy is carried out are :—

(*a*) breeding and testing of new canes with the object of producing varieties yielding more sugar to the acre and resistant to the main pests and diseases of cane in Mauritius ;

(*b*) breeding of early-maturing, high-yielding canes, so as to increase the area of cane which can be harvested at the time of maximum sugar content ;

(*c*) breeding of specialised varieties of cane for different localities with the objects of extending the area capable of cultivation in cane and raising the yield of areas at present marginal ;

(*d*) study of the effects of cultural practices and fertilizer treatment on the yield of cane, and dissemination of the knowledge obtained from such studies ;

(*e*) study of the physiology of the cane plant, in order to ascertain the factors associated with high yield and resistance to pests and diseases ;

(*f*) investigations into the control of weeds of cane fields, and dissemination of the information obtained from such studies ;

(*g*) propaganda and demonstration of up-to-date methods among small planters, with the object of raising their yields to the level attained by the estates and the large planters.

Twenty Third Annual Report of the Sugarcane Research Station for 1952

Introduction

Sugar production in 1952 amounted to nearly 468,000 metric tons, which is about 16,000 tons less than the record production in 1951, although the area of sugarcane harvested was increased by about 3,000 arpents. Thus the sugar production per arpent harvested fell from about 3·03 metric tons to 2·87 metric tons.

The reason for this reduced yield is not far to seek. December 1951 and January 1952 were abnormally dry months, with the result that the canes suffered to some extent from drought conditions, particularly in the drier parts of the island where irrigation is not practised. Rainfall in all districts was satisfactory during the months of February, March and April, but it was somewhat deficient in the drier regions during May and June. It was somewhat in excess of normal from July to September, and much in excess during November and December. Thus the normal season for maximum growth was not particularly favourable, whilst conditions for ripening from July onwards were poor, particularly during November and December. As a result, the amount of cane produced was much less than in the previous year and the extraction rate—11·43 per cent—although higher than in 1951 was still very low compared with the period 1948—1950, when the extraction was about 12·25 per cent. Another factor which certainly contributed to the low extraction rate was the early start in June by some factories, at which time the extraction was slightly above 8 per cent. All factories had finished crushing by the end of the year. Meteorological data are given in the following table :—

RAINFALL INCHES

Months			*Experimental Station Pamplemousses*		*Central Experimental Station Réduit*		*Royal College Curepipe*		*Temperature Departure from Normal*
			Registered	*Normal*	*Registered*	*Normal*	*Registered*	*Normal*	*°Centigrade*
November	1951	...	2·15	2·13	3·50	2·33	5·61	5·71	−0·2
December	1951	...	0·87	4·91	0·85	6·37	3·07	9.71	+0·1
January	1952	...	2·00	9·56	6·98	10·32	10·04	16·33	+0·4
February	1952	...	6·85	8·74	13·78	10·95	19·94	17·28	−0·4
March	1952	...	12·84	9·32	11·14	11.94	10·10	19·31	+0·1
April	1952	...	8·59	5·96	3·15	5·41	9·60	12·39	+0·2
May	1922	...	2·59	4·48	2·10	4·24	10·60	9·86	+0·8
June	1952	...	2·54	3·43	2·07	3·11	11.14	7·47	−0·6
July	1952	...	4·60	2·93	3·98	2·75	14·01	8·57	—
August	1952	...	2·85	2·59	3·59	2·47	12·90	7·79	—
September	1952	...	2·02	1·83	2·20	1·71	7·60	5·78	—
October	1952	..	1·13	1·95	2·21	1·91	9·22	4·52	−0.4
November	1952	...	4·02	2·13	2·80	2·33	7·26	5·71	−0,4
December	1052	...	13·57	4·91	14·09	6·37	19·39	9·71	+0,3
	TOTAL	..	66·62	64·87	72·44	72·21	150·48	140.14	−0·1

It seems not impossible that a further factor contributing to the low extraction may be the increasing quantities of nitrogenous fertilizers which are being used. The figures given in the following table were received from the Officer-in-Charge, Fertilizer Control:—

AMOUNT OF NITROGENOUS FERTILIZERS ALLOCATED TO CANE GROWERS

Crop Year	*Sulphate of Ammonia* Tons	*Nitrate of Soda* Tons	*Chilean Nitrate of Potash* Tons	*Ammonium Chloride* Tons
1947—48 ...	11,480	6,050	—	617
1948—49 ...	9,900	6,100	600	—
1949—50 ...	16,600	4,500	1,400	—
1950—51 ...	13,500	6,600	1,000	—
1951—52 ...	19,500	6,150	1,200	—

This shows that there was a very large increase in the amount of nitrogenous fertilizers allocated to sugar growers for the 1952 crop and the question may be raised as to whether or not the optimum application has been exceeded both from the agronomic as well as the economic point of view. Experiments have shown that over a period of six crops, the application of 30 kgs. of nitrogen per arpent have reduced the commercial cane sugar per cent cane by 0·15 per cent and that the addition of a further 30 kgs. per arpent has lowered it by a further 0·16 per cent. It has also been remarked that the depressing effect on sucrose content is more marked in virgin canes and the early ratoon crops than it is in the older ratoon crops. It would seem that this point would repay investigation on a commercial scale.

No new variety was added to the list of approved varieties during the year, but three of the Barbados varieties have been propagated on a limited scale, so that if and when they are ultimately added to the list, there will be a supply of planting material immediately available for distribution to growers. The cane variety Ebene 1/37 has been propagated by planters to some extent, as is also the case with M. 423/41, but the extent of these plantations does not materially affect the cane variety situation. M. 134/32 is still the only variety grown on a large scale, and it is still true to say that the sugar industry of Mauritius is virtually dependant on this variety and this variety alone. Although it is somewhat susceptible to chlorotic streak disease in the wetter and cooler parts of the island, it is just as good a variety as ever and shows no signs of 'degeneration'. Ebene 1/37, however, which is in some respects better than M. 134/32 in the wet regions, appears to be even more susceptible to chlorotic streak disease than does M. 134/32. If this observation is confirmed, it will be a very serious fault, as chlorotic streak is widely spread in the wet cool upland districts. Indeed increasing attention will have to be paid to this disease by attempting to produce a variety resistant to it, whilst still capable of giving satisfactory field yields and having good sucrose content. Until further information is available this variety, Ebene 1/37, should be propagated in the wet districts with caution, and as far as possible planting material should be obtained from drier districts where the disease is not so prevalent.

Arrowing of the cane crop was much less in 1952 than it was in 1951, but in spite of this a satisfactory number of crossings could be made. Fuzz fertility was also on the low side, but a sufficient number of seedlings was obtained for planting out at the three experiment stations. The selection and further testing of the seedlings through the different stages has been continued, and although some promising ones have been found, they have not yet reached the stage when they can be considered for release.

Interchange of planting material with other sugar producing countries has been continued, and the quarantine greenhouse has now been filled with nine varieties, including varieties from the following sources : Australia, Barbados, Hawaii, Java, and Réunion Island. The main object of making these importations is to increase the range of our breeding material, with the secondary object that a good commercial variety may be selected from them. Planting material has been sent to India, Viet Nam, South Africa, Kenya, French Equatorial Africa, Aden, Protectorate, the United States of America. Belgian Congo, Martinique, Réunion Island and Nigeria. Fuzz from various crosses was also sent to Pakistan and British Guiana, This interchange of planting material, which is of great assistance to plant breeders, has been greatly facilitated by the extension of air services, which whilst costly are rapid and efficient.

Four cane varieties released from quarantine during the year, viz., Co. 419, M. 336 (Mayaguez), M.L. 3-18 and P.R. 905 have been included in variety trials at Réduit and Pamplemousses and will later be included in others.

Nine varieties were introduced during the year, three from the U.S.A. and six from Réunion Island. Those from the U.S.A. included H. 32-8560 and H. 37-1933, two varieties which the Hawaiian Planters Association allowed us to import on the express condition that they were used as breeding canes only and not as commercial canes. All these nine varieties are still in quarantine.

In the Chemistry Division, the chief emphasis has been laid on field experiments. Final harvestings have now been made in the extensive series of factorial $3 \times 3 \times 3$ NPK trials, when the few remaining experiments were reaped in sixth ratoons. In general, large responses are obtained from the application of nitrogenous fertilizers, the increases becoming more pronounced with the older ratoons. At the same time, the depressing effect upon the sucrose content appears to diminish with increasing age ; in the virgin crop and earlier ratoons this decrease may be important but less so in the older ratoons. Responses to phosphates are chiefly apparent on the highly laterized soils of the superhumid region and on small planters lands. These responses may be erratic and need not be confined to any one class of soils, as so much depends upon the past treatment of the soil. Phospate applications do not appear to have any effect upon the sucrose content of the cane. The main response to potash is seen in the superhumid zones, but again this effect can be erratic due to past history. In cases

where the field yield is appreciably increased by potash applications, it may also be expected that the sucrose content of the canes will be increased. In general, liming experiments have shown no significant response, and this result confirms those previously obtained here and elsewhere.

In the powdered basalt trial, however, a large increase was again obtained, the total increase due to the application of 182 tons of powered basalt at planting being 28 tons of cane over five crops. There is obviously much scope for further investigation in this connection, to determine the factors responsible for the increases recorded. The cost of basalt dust at stone crushers is about Rupees 5 per ton, but to this must be added the cost of transport and spreading. This represents a very big outlay per arpent of land and, in addition, there are certain physical limitations in the amount of material available. It must be admitted that increased yields do follow high applications of crushed basalt in the highly laterized mature soils of the superhumid zones. It would not appear that the cause for the increase lies in the calcium or magnesium content, so it may be that the reason is because of its physical action or because of minor elements contained in the basalt. An examination of the ash content of the leaves by spectroscopic methods may possibly show some differences in the trace element content, but unfortunately the necessary equipment is not available in Mauritius.

The Botany Division was more seriously handicapped by shortage of staff during the year than any other, and because of this the range of work had to be very seriously restricted. A series of experiments to test the effect of various chemicals on the growth rate, sucrose content and yield of sugarcane was started, but no results are yet available. Work has also been started on methods of chemical control of the weeds which are resistant to present methods. Root pruning tests have indicated that the Barbados varieties are less resistant to attack by the white grubs of Clemora Smithi than M. 134/32. Interplanting of the virgin crop of sugarcane with foodstuff crops has had no effect on the yield of the sugarcane in the first ratoon crop.

The Extension service has been continued chiefly by means of field demonstrations and lectures. The demonstration plots are conducted on a very simple plan, and consist of a comparison between the standard method of fertilizer application practised by the small planters in the area concerned and the method recommended by the Sugarcane Research Station. The latter method has resulted in an average increase of 4 tons of cane per arpent. Although all aspects of cane cultivation have been discussed at the meetings, the planters now seem to be most interested in chemical methods of weed-control. A notable example of the way in which the Extension Service can help planters was shown in the case of a planter of 140 arpents. As a result of advice given to him by the Extension Service Officers, he changed his fertilizer programme, with the result that he harvested 4 tons of cane per arpent more in 1952 than in 1951, whereas most of his neighbours suffered reduction of from 2 to 4 tons per arpent. Foliar diagnosis studies still show that in the

majority of cases, canes grown by small planters are suffering from phosphate and potash deficiencies, with a shortage of nitrogen in many cases.

Detailed reports of the work performed in the various divisions are given below.

Retrospect and Prospect

December 4th 1929 was a day of some significance to Mauritius agriculture, for it was on that day that the Sugarcane Research Station was established, although officially it did not begin active operations until January 15th, 1930, the date of arrival of its first Officer-in-charge, Mr. A. G. G. Hill. It was not fully staffed however until March 1932, when Dr. H. Evans assumed the post of Physiological Botanist. In those days, the Station was temporarily and inadequately housed in two rooms in the College of Agriculture, but in spite of this, rapid progress was made with the research work undertaken. That such progress was made is a well deserved tribute to the excellent team spirit which was developed and to the whole-hearted co-operation between overseas and local staff and between the three divisions of the Station.

The sugar industry in the early 1930's had not then reached that high degree of efficiency which it has now attained, and consequently the problems then encountered were easier of solution than those of the present day. The chief sugarcane variety then was the Big Tanna, with B. H. 10/12 already beginning to attract attention. The former had been a very valuable asset to Mauritius for over fifty years, but in this progressive world it was dropping behind in the race. Consequently the first and most urgent task was the breeding of better varieties. Fortune smiled on the work of the cane breeders, and within three years a variety had been born which was destined to revolutionize the sugar industry of this Colony. Indeed it might be said that the success was too complete, as it has not been possible to improve on this variety up to the present time.

Little was known about the distribution of the different soils and their properties. Moreover, the nutritional requirements of the sugarcane were very imperfectly understood. Progress has been made with these questions, and although the final word is still far from having been said, at least the fertilizing of the cane crop is now on a much more rational basis.

As a result of these improvements one of the ambitions of every agriculturist has been achieved : to make two blades of grass grow where one grew before. It is probably no exaggeration to say that but for the work of the Sugarcane Research Station in the period between its inception and the start of World War II, the sugar industry of Mauritius would have been in a parlous state during those grim war years. Unfortunately the exigencies of the situation deprived the Station of the services of most of its officers, either partially or *in toto*. Naturally the volume and quality of the work suffered, but the cane breeding work was maintained at the highest level of efficiency possible.

Lack of staff has been the general order of the day since 1945. Improvement was effected in one direction, however ; new buildings were erected for the housing of the Station, and these buildings were formally opened by His Excellency the Governor on 12th January, 1950. On this occasion His Excellency put forward the suggestion that the Sugarcane Research Station should be taken over by the sugar industry itself. In this way it was hoped that adequate staff would be enlisted amongst other advantages. After protracted discussions, a Bill has been prepared to authorize the change-over, but it has not yet been brought before the Legislature for approval.

It is almost axiomatic that progress must be maintained otherwise the decline will set in. Moreover world competition will in all probability become more intense and the only sure foundation on which hopes for the future can be based is that of ever increasing efficiency in the sugar industry. It is clear that part of this task must fall upon the shoulders of the sugar planters and manufacturers, but it is equally clear that part of the responsibility must depend upon the research organisation, which must provide the tools with which the planter and manufacturer can work.

The present status of the Sugarcane Research Station is highly unsatisfactory. Staff shortages, which are not likely to be remedied until a final decision has been taken about the future control of the Station, and uncertainty in the minds of the present staff as to their prospects in the proposed new organisation all militate against efficiency. Any long delay in reaching a final decision is bound to have repercussions in the sugar industry in the long run, as lack of adequate research is likely to result in our falling behind in the race for reducing cost of production to enable our sugar to compete successfully on a more competitive buyers market.

Although the emphasis in the past has been on the agricultural side of the industry, it may well be that the manufacturing side will require more investigational work in the future, especially with respect to the by-products of the industry.

Staff

The staff position remained as serious as in the previous year, and no new appointments were made. The chief staff movements were :—

Mr. E. Rechecouste, Assistant Botanist, returned to the Colony on 26th August after obtaining the B Sc (Hons) Degree of the University of London. He resumed duty as Acting Botanist.

Mr. J. B. de Gersigny resigned from his post of Field Demonstrator in March 1952.

Acknowledgements

After more than twenty-eight years service in the Colony, of which about twenty-three have been spent in close connection with the Sugarcane Research Station, the time is fast approaching when I must hand over to others.

I therefore take this opportunity to express my sincerest thanks to all my colleagues during these many years for all the help that I have received from them. I would also like to record my appreciation of the co-operation which I have received from the Chamber of Agriculture and from all members of the planting community. I trust that the Station will continue to receive the same loyal support from all as it has done in the past, whatever its name, whether it be the 'Sugarcane Research Station' under Government control or the 'Sugar Research Institute' coming under the direct control of the 'Mother Industry'.

It is my final hope that research will continue to pay such handsome dividends as it has during the past.

N. CRAIG,

20th February, 1953. *Deputy Director of Agriculture, and Officer-in-charge S.R.S.*

PART I—CANE BREEDING DIVISION

A satisfactory crossing programme was possible despite the scarcity of arrows in the breeding plots, particularly at the Pamplemousses Experimental Station. Crosses made at Réduit and Pamplemousses total 172.

New parental varities such as M. 11/43, M. 24/47 and C.P. 36-13, were available for crossing. The first variety is an early maturer, but somewhat lacks vigour, so that it has been mated with vigorous parental types with the object of combining in one variety early maturity and high yielding capacity. M. 24/47 is a promising variety selected from a second year trial in 1951; it is unfortunately not a prolific pistillate parent. C.P. 36-13 flowers early and freely and has yielded extremely fertile fuzz when crossed with several male parents.

No B.H. 10/12 arrows were available either in the breeding plots or in the fields. In view of the fact that this variety is practically a non-tasseler, the Station has applied to Barbados for fuzz.

There has been no change in the breeding policy which can be summarized as follows :—

(1) the breeding of early maturing varieties having better juice than M. 134/32 early in the crushing season ;

(2) the production of varieties adapted to the poor leached soils of the superhumid localities and resistant to Chloratic Streak;

(3) the production of varities to meet certain specific needs, and capable of replacing N. 134/32 should it show signs of deterioration in the future.

The second objective has assumed great importance, the variety Ebene 1/37, which crops particularly well in the wetter localities of the Island, showing great susceptibility to Chlorotic Streak.

The seed-bearing fuzz was of abnormally low fertility, even that from crosses usually prolific. There is, however, a sufficiency of seedlings for the 1st year trials.

Damping-off disease occurred in some of the seedling batches at Réduit and Pamplemousses, but was very successfully controlled by means of Solusanigran, an organo-mercurial product, applied at the rate of 10 grammes per 4 litres of water per square metre of soil surface. No seedling pans treated with this disinfectant prior to planting the fuzz showed signs of the disease. It is therefore intended to use this treatment as a preventive measure against damping-off disease after carrying out systematic experiments in 1953.

The table below shows the extent of the breeding work :—

Particulars	*Réduit*	*Pamplemousses*	*Hermitage*	*Total*
Number of crosses made ...	114	58	—	172
Number of seedlings obtained ...	15,104	18,916	—	34,020
Number of seedlings potted ...	14,457	8,359	4,500	27,316
Number of seedings transplanted	8,562	7,136	6,030	21,728

Potted seedlings have been transported from Réduit to Hermitage in a Station Wagon for planting in the field at the latter Station. Some trouble was experienced with cutworms in the glass-house at Hermitage and a good many seedlings were destroyed. This is due to the fact that potted seedlings had been removed from the glasshouse, transferred to the nursery and then moved back to the glasshouse because they were still backward.

First Year Trials

Owing to very favourable weather, the field plantations of the 1952 seedlings could be completed much earlier than usually. At Réduit, for instance, transplanting commenced on 3rd December and was completed on the 13th. Probably for the first time in the annals of the Station, it has not been necessary to water or irrigate the seedlings, rainfall having proved sufficient.

An experiment was carried out on a small scale at Réduit to determine whether the normal practice of trimming the leaves of the potted seedlings prior to transplanting is an absolute necessity. Alternate rows of seedlings from several crosses with trimmed and entire leaves were planted out, but the frequent and abundant rains completely masked the effect of the treatment if any.

Experience gained so far tends to indicate that seedlings planted on land having borne other crops than sugarcane for a certain period do better than those planted in fields planted to cane for a continuous period of years. If this is confirmed later, the planting of green dressing in plots to be allocated to seedlings may become a necessary practice particularly at Hermitage. A scheme is afoot at Réduit for rotating sugarcane and other crops, land belonging to the Agricultural Division of the Department of Agriculture being loaned to the S.R.S. for planting seedlings. It is unfortunate that the Station cannot reciprocate owing to land shortage.

In the light of experience acquired, it would appear that for Hermitage conditions :—

(1) maize to control borers in the seedling plots should be sown a week or 10 days before transplanting seedlings ;

(2) if the number of seedlings potted out is largely in excess of that which can be transplanted, the weaklings should be discarded as it is highly probable that they will be wiped out by borers or suppressed as a result of interaction with more vigorous neighbours ;

(3) it is necessary to try to avoid gaps in the seedling plots which have to be supplied later with sprouted setts of M. 134/32 ;

(4) it is unnecessary to stimulate too much the growth of transplanted seedlings as they occupy the ground for nearly 20 months, get too big and render selection difficult. The ideal would be to select from first ratoon, but this is not possible at the present due to lack of space.

Selection from the hybrid seedling populations was made in August. Owing to the unfavourable maturations conditions, the Brix of the seedlings was very low and unreliable. Hand refractometer tests were therefore, presumably for the first time, dispensed with, and a higher percentage of seedlings selected for second trials.

Second Year Trials.

These trials do not call for special comments, except that the new design, which being simple and economical of ground space, allows of the testing of a large number of selections. The layout is based on the principle that it is better to test a large number of varieties with average accuracy than a smaller with high accuracy. The study of the ratooning capacity of the selected seedlings up to the second ratoon stage is a decided advantage as no time is lost in dealing with poor ratooners in subsequent trials.

Third Year Trials.

Only three trials have been laid down at Hermitage to test about 15 selections. It has been decided to eliminate completely third trials which serve no useful purpose as most experiments carried out in the past have been in virgins only. The present policy is to plant second year selections direct in variety trials on estates after multiplication at the Experimental Stations. It has thus been possible to short-cut the testing of varieties and to include in the same variety trials seedlings bred in 1942 to 1947. This means the saving of three to four years.

The present trends in sugarcane breeding are such that quick methods are necessary for sorting out the varieties with the most valuable combining properties from the mass of their less successful fellows.

The economy of land resulting from the elimination of third trials cannot be overlooked especially nowadays that congestion at the Experimental Stations must be avoided by all means.

Variety Trials.

Good growing weather was again experienced in 1952, but conditions for cane ripening were unsatisfactory. The remarks made in the Annual Report for 1951 can consequently be applied to the results of variety trials harvested during the year under retrospect.

Ten trials have been laid down on estates to test a large number of varieties, the most promising of which being : 11/43, 129/43, 31/45, 24/47 and 147/44. Two trials including the imported varieties Co. 419, M. 336, M.L. 3-18, and P.R. 905 have, in addition, been planted at Réduit and Pamplemousses ; a third trial will be planted at Hermitage in March 1953 as soon as planting material is available from the propagation plot at Réduit. Co. 421 will probably be included in this trial.

The Canal Point varieties 34-120, 36-13 and 36-105 are unsuitable for commercial growing and have been kept for beeding purposes.

A large number of trials has been reaped during the crop. Approximately 14 trials comprising the Barbados varieties 3337, 34104, 37161 and 37172 have been cut in third ratoons, and further data of their ratooning power obtained. The important point which emerges from all the records obtained since these canes have been tested in field trials, is that all four are high grade varieties having given good accounts of themselves as regards both tonnage and quality, and are likely to prove serious competitors with M. 134/32. The results obtained in 1952 bear out those obtained the previous years.

The productive figures obtained for the B varieties are derived from 63 to 78 harvests distributed in space and time under very diversified conditions and are therefore very trustworthy. B 34104 was found to be very susceptible to Leaf Scald in British Guiana, but it must be mentioned that not a single case of this disease has been noticed since the variety has been tested in Mauritius. As it is very good otherwise, the plant breeder must linger in a tantalizing state of suspended judgment. The matter of its release, however, must rest with the Cane Release Committee.

The Cane Release Committee met on the 11th June, 1952, to consider the desirability of recommending B. 3337, B. 37161 and B. 37172 for release. After a critical scrutiny of their qualifications, the Committee's verdict was that it would be necessary to pursue the study of the yielding ability of these varieties in third ratoons, and of the resistance of B. 3337 to gumming before definitely adding them to the list of approved varieties. The Committee also recommend that the three varieties be propagated on a small scale. Propagated plots have in consequence been established on estates and at Richelieu Experimental Station.

The Cane Release Committee also dealt with the case of the variety M. 213/40 whose juice qualities are not satisfactory enough to warrant its recommendation for commercial growing. Estates on which it has been multiplied have been asked to take the necessary steps to have it uprooted as soon as possible.

M. 423/41 again gave unsatisfactory juices in general in variety trials, but its yield of cane was as good as that of M. 134/32. Its relatively low and erratic sucrose content make it a hazardous cane particularly for the wetter localities where it cannot mature adequately.

Two trials including B.H. 10/12 were cut in ratoons at Black River, the results showing that this once most prized variety can no longer compete with the modern varieties. Not only has its yield capacity decreased, but its richness shows indications of regression. Even at Mon Désir S.E., its last stronghold, it is rapidly receding from favour.

With regard to the newly produced M varieties, the following appear in a programme of regional tests :—11/43, 129/43, 31/45, 24/47 and 147/44. They have all been tentatively classified as promising and worthy of further trials on estates.

M. 11/43 has excellent juice early in the season and a good canopy. Its yield capacity has unfortunately not been up to the mark, and low yields have in some cases offset a very high sugar content. It has been used as a parental variety in many crosses, and it is hoped that it will transmit its high early sugar to its progeny. It is being tested under irrigation at Médine as its water requirements appear to be high.

M. 129/43, a derivative of S.C. 12/4, is very rich and is a fast grower. Its luxuriant growth makes it very attractive particularly in plant cane. M. 31/45, probably the most outstanding of the above mentioned varieties, combines growth vigour and good juice. Its freedom from arrowing is a valuable asset. M. 24/47 gave outstandingly good results in a second trial at Réduit and is probably a sound ratooner.

M. 147/44 is a vigorous variety derived from Co. 281 and M. 63/39. It appears in a trial laid down at Britannia in June 1952 and comprising, *inter alia*, Ebene 1/37 and M. 134/32. There was a very severe outbreak of borers some time after planting resulting in the destruction of all the varieties in several blocks of the trial except M. 147/44. M. 134/32 and Ebene 1/37, in neighbouring fields, have also been very badly affected. These results indicate that M. 147/44 is probably very resistant to borers.

In order to speed up the propagation of varieties having commercial or near commercial prospects, promising varieties included in variety trials are multiplied on a small scale on estates with factories, so that by the time the Cane Release Committee decides about their fitness for release, ample planting material will be available for further propagation or for distribution to planters. Should they prove unsuitable later, there will be no difficulties in uprooting the small areas planted in advance. It must be admitted that much time can be saved in that way, a factor of great importance when one bears in mind that there is at the present virtual dependence on one variety.

In view of the enormous amount of work involved in the laying out and harvesting of variety trials, in collecting and analysing the data, it has been decided to restrict variety trials, including home-bred or imported varieties, to well definite ecological areas. Unless such a measure be resorted to, it will be well-nigh impossible to deal with the full programme of regional tests.

Other Investigations

Control of Arrowing—The experiments conducted to try to induce arrowing in the varieties R.P. 8 and B.H. 10/12 by injection of juice extracted from canes containing rudimentary inflorescences have again given negative results. The time of flower initiation had previously been ascertained by examining in the field canes of several varieties. While the first microscopic inflorescences were noticed towards the beginning of March 1951, they were observed towards the end of the same month in 1952. There was a discrepancy in the time of flower initiation in 1951 and 1952 : the first embryonic arrows were not seen in the same varieties both years.

By sampling about 100 canes from several fields at the end of March 1952, it is possible that the right stage of florigen production, that is, that which immediately precedes flower bud formation, will have been hit. But, as already mentioned, negative results were obtained for the second time.

The B.H. 10/12 canes at Reduit and Pamplemousses having received high phosphate dressings also failed to arrow.

The R.P. 8 and B.H. 10/12 canes planted under water-logged conditions at Pamplemousses in 1951 have progressed satisfactorily. The B.H. 10/12 canes planted at Rich Fund are also making good growth, while those at Bel Ombre are backward.

2. *Rapid Assessment of Ratooning qualities of Cane Varieties*—The experiments started in 1951 have been pursued with interesting results. Full details will be given in the next report.

Export of Cane and Fuzz

Cane cuttings have been exported by air freight to the following countries : India, Viet Nam, South Africa, Kenya, French Equatorial Africa, Aden Protectorate, U.S.A., Belgian Congo, Martinique, Reunion Island and Nigeria.

The method of packing cuttings generally used is that recommended by the U.S.A. Department of Agriculture. After waxing the ends, the cuttings bearing three to four buds, are wrapped individually in old newspaper. The two pieces of a variety are then tied together and wrapped in a piece of butter paper. The resulting bundles are tied together and cushioned on the outside by a layer of corrugated paper, and the whole parcel finally receives several wrappings of brown paper. Fuzz from several crosses was despatched by air to Pakistan and British Guiana.

Importation of Varieties

The following varieties have been imported from overseas in October and planted in the quarantine glasshouse at Reduit :—

From U.S.A.—Eros, H. 32–8560, H. 37–1933.

From Reunion Island—R. 336, R. 397, B. 41227, P.O.J. 3016, Pindar and Trojan.

Notes on Other Work

The glasshouse used to plant fuzz at Reduit was repaired by the Public Works Department.

2. A Stevenson Cage was set up at Hermitage Experimental Station. Temperature and Relative Humidity records have been collected from 1st January, 1953.

3. A brief history of the Sugarcane Research Station, its activities, scientific researches, etc., was written for publication in the Chamber of Agriculture's Centenary Book.

4. A talk on the production of M. 134/32 was given over the radio, and has been published in the January–February issue of "La Revue Agricole de l'Ile Maurice".

5. An invitation was kindly extended to the writer to attend the Congress of the South African Sugar Technologists' Association held in Durban, South Africa, in February 1952. A short address on sugarcane breeding in Mauritius was presented to the Congress.

6. The writer went on mission to Reunion Island in July 1952. Excursions and visits were planned out to give fundamental information on the cane breeding work, the varietal position and the incidence of Mosaic disease in the Island.

7. Exhibits illustrating the most important aspects of cane breeding in Mauritius have been sent to Madagascar in connection with the Tananarive Exhibition. The attempt made to break away from the stereotyped form of display was a success. Among a number of outstanding displays was a chart in colours of the pedigree of M. 134/32 which had also been exhibited at the National Gardens Show held in London in 1949.

The Cane Breeding Division staged a well attended exhibit at the Show sponsored by the Red Cross and held at Souillac in October 1952.

A. DE SORNAY,
Plant Breeder.

28th January, 1953.

PART II—CHEMISTRY DIVISION

Fertilizer Trials

The series of factorial fertilizer experiments was brought to an end this year after the few remaining trials had been harvested in sixth ratoons.

It is appropriate at the end of a rotation of a series of experiments to consider all the data obtained so as to allow for a better interpretation of the results.

It is necessary to recall that these experiments were established with a view to developing the foliar diagnosis technique with respect to the nutrient status of the sugarcane plant. The main object was to investigate whether plant food deficiencies could be diagnosed by simple analysis of the leaf punch, so as to enable fertilizer programmes to be better formulated. This aim was to be secured by a series of factorial experiments comprising three levels of nitrogenous, phosphatic and potassic fertilization under different conditions of climate and soil type.

The series has fully served its purpose with respect to phosphatic and potassic fertilization, and besides, has allowed a large amount of useful information to be collected which contributed to a better understanding of the problem.

Nitrogen.—The results of the experiments show that a large response is always obtained following fertilization with nitrogen. This response is greater in subhumid regions than in the more humid ones, thus indicating a better utilization of nitrogen in the more fertile soils of the subhumid regions.

It was also established that increasing the amount of nitrogen applied in old ratoons was beneficial and this holds good for all localities. Such results could be explained by the larger area covered by the cane stool in old ratoons as compared to that in virgins or first ratoons ; the larger cane stool no doubt needs a larger amount of fertilizer.

Phosphate.—Most estate soils seem to have a good supply of this nutrient, except the gravelly soils of the more humid zones of Grand Port, where large phospate deficiencies are encountered.

It is unlikely that these deficiencies could be attributed to conditions of climate or soil type, since the phosphate deficiencies in the majority of small planters' lands seem to indicate that the phosphate status of our soils depends solely on their previous fertilization.

Foliar diagnosis studies have shown that a phosphate content below 0·45 per cent dry matter of the leaf punch constitutes a deficiency in that nutrient and that the further away it is from that figure, the greater will be the deficiency.

Potash.—A small response to potash is encountered in almost all regions, but this response is of particular significance in superhumid zones. In these regions restitution of the potash contained in the molasses is recommended. When this is not economical, higher amounts of potash in the fertilizer programme are essential.

Foliar diagnosis studies over this series of experiments have shown that 1.45 per cent dry matter of the leaf punch is the content in K_2O below which an increase in yield is to be expected after application of a potassic fertilizer.

Of the three major plant nutrients, nitrogen is by far the most expensive ; it is moreover the main single factor contributing to high yields. It is therefore essential that ideal conditions be created so that no limiting factor will prevent this important nutrient to exert its full effect. These conditions necessitate that phosphate and potash be not deficient in the soil. In such cases it is important to make up for these deficiencies so that the action of such an expensive nutrient as nitrogen be not limited by relatively cheap nutrients like phosphate and potash.

Effect of fertilization on sugar content.—Nitrogen has been found to have a deleterious effect on Sugar Content of sugarcane, which is more apparent in the humid and superhumid zones. This effect is apparent until the 3rd ratoon crop and then diminishes until it is practically negligible in very old ratoons.

No effect on sugar content could be attributed to phosphate fertilization, but potash has been found to increase the sugar content in those regions where it has also increased the yield of cane.

* * *

It may be of interest to compare the amount of nitrogen applied in fertilizers to that which is exported from the field annually. The composition of the cane has been determined many times at this Station and the average figures for the nitrogen associated with one ton millable cane of the variety M. 134/32 are as follows :—

	Kgs. N. associated with 1 ton of millable cane
Cane	0·62
Cane tops used as fodder	0·28
Outer green leaves	0·36
Trash	0·36
TOTAL ...	1·62

The trash and the outer green leaves are not usually exported from the field. The average quantity of N removed is therefore that which is found in the cane and the fodder and which amounts to 0·90 kg. of N per ton of cane. In practice the quantity exported is even less, as only part of the fodder is removed and on the other hand, a certain amount of N is returned to the field in scums and molasses.

From figures pertaining to the allocation of fertilizers, it was calculated that an average quantity of 1·3 kgs. of N was applied per ton of cane produced. Large estates are allocated over 15 per cent more nitrogenous fertilizers than small planters, and it is reasonable to think that in many cases the average quantity applied by these estates approximates to 1·5 kg. N per ton of cane, which application is, in the opinion of the writer, too high.

The following table giving the quantity of sugar produced in tons per arpent in the series of factorial fertilizer experiments will substantiate the above views :—

N applied in kgs/arpent	*0*	*30*	*60*
Virgins	3·24	3·47	3·55
1st Ratoons	2·95	3·76	3·77
2nd Ratoons	3·06	4·21	4·27
3rd Ratoons	3·03	3·94	4·19
4th Ratoons	2·73	3·71	4·09
5th Ratoons	2·52	3·46	3·78

It may be inferred from the above figures that until the third ratoons, no benefit will be derived in applying more than 30 kgs. of nitrogen per arpent. In older ratoons it might prove beneficial to increase the amount of nitrogen applied, but in doing so the economic limit should be borne in mind.

Foliar Diagnosis

Foliar diagnosis studies on this series of factorial fertilizer experiments have shown that this method of determining the nutrient status of the cane plant is very reliable as far as phosphate and potash are concerned, but presents certain limitations in the case of nitrogen. In a previous report, the writer has already pointed out that the N index is subject to so many fluctuations that it cannot be regarded as very reliable. An investigation carried out during the year has brought further evidence in this connection.

In addition to the 3rd leaf sampled in usual foliar diagnosis work, the last green leaf of the same cane was also sampled with a view to ascertaining whether in cases of deficiency there is a certain translocation of the nutrient from the older leaves to younger ones. An analysis of the figures from 58 samples thus collected brings forward the following interesting points :—

When no deficiency in either phosphate or potash exists, the content of the two categories of leaves are as follows :—

% Dry Matter Leaf punch

	3rd leaf	*Last green leaf*
N	1·74	1·32
P_2O_5	0·55	0·38
K_2O	1·73	0·81

There is thus a lower concentration of the 3 nutrients in the older leaf.

When potash is deficient, the results are almost identical with only a lower K_2O index in the 3rd leaf :—

% Dry Matter Leaf Punch

	3rd leaf	*Last green leaf*
N	1·80	1·46
P_2O_5	0·51	0·37
K_2O	1·22	0·74

When phosphate is deficient, the picture is altogether different :—

% Dry Matter Leaf Punch

	3rd leaf	*Last green leaf*
N	1·58	1·58
P_2O_5	0·37	0·31
K_2O	1·33	0·78

Thus it is observed that in cases of phosphate deficiency, the N content of the 3rd leaf decreases while that of the last green leaf increases ; in other words the difference between the N content of the 3rd and last geen leaves is much attenuated. In some cases the last green leaf had even a higher N content than the 3rd leaf. This investigation is being continued in order to determine to what extent the Nitrogen index is influenced by the amount of phospate in the soil.

Lime Trials

The series of lime trials now consists of fifteen trials, four of which are $3 \times 3 \times 3$ factorial experiments and the remainder 4×4 latin squares.

The factorial experiments were harvested in 3rd ratoons and the results do not show much difference from those obtained the previous years. The average results for the four experiments are given below in tons cane per arpent.

	0	*1*	*2*
Lime	29·1	30·5	29·3
Potash	28·9	30·1	30·1
Magnesia ...	29·9	29·2	29·4

In the series of latin squares, the lime was applied at planting at the rate of 3 tons of slaked lime per arpent, and no lime was applied in ratoons. The magnesia was applied at the rate of 50 kgs. of sulphate of magnesia to each crop. The results are given below : —

Results of Lime Experiments

Cane yield Index

Locality	*Category*	*Control*	*Lime*	*Magnesia*	*Lime and Magnesia*
Valetta	1st Ratoons ..	100	95	99	93
Hermitage	,,	100	106	91	100
Unité	Virgins ...	100	100	102	97
Deep River	,, ...	100	111	109	123
Rose Belle (I) ...	,, ...	100	113	111	114
,, (II) ...	,, ...	100	124	95	97
New Grove ...	,, .	100	144	118	136
Riche-en-eau (I) ...	,, ...	100	91	90	91
,, (II) ...	,, ...	100	87	100	102
Belle Rive	,, ...	100	107	100	104
General average in Tons cane/arpent...	,, ...	23·0	24·3	23·2	23·9
Cane yield index	...	100	106	101	104

The average figures do not show any response worth mentioning, to either lime or magnesia, but the individual results show very large responses to lime and magnesia at New Grove, Rose Belle and Deep River. Samples of soil from the control plots were taken and pH determinations made according to the KCl method used in Queensland

to determine the lime requirement of soil and by Kuhn's method, the one used at the Station. The results are given below :—

	K Cl metkod	*Kuhn's method*
Minimum ...	... pH 4·3	pH 4·4
Maximum ...	... pH 4·9	pH 5·4
Average ...	... pH 4·6	pH 4·9

Investigators in Queensland have found that only soils with a lower pH than 4·5 will respond to lime application.

In our experiments, the soils where a response to lime occurred had an average pH of 4·6 ; on the other hand soils with a lower pH did not show any response.

It is difficult at this stage to understand the action of lime on cane yield under local conditions, but the series is being continued and it is hoped that an explanation will soon be found in that respect. These responses to lime have occured in soils which are deficient in available phosphate and it is not unlikely that the lime applied has contributed to a greater availability of the soil phosphate.

Sugar analyses made on composite samples gave the following average results for the 1952 crop :—

	C.C.S.
Control	10·69
Lime	10 38
Magnesia	10·89
Lime+Magnesia	10·52

Average figures showing the effect of lime and magnesia on sugar content for the whole series, i.e. about 30 experiments, are given below :—

	C.C.S.		*C.C.S.*
No lime	12·51	No magnesia ...	12·43
With lime	12·41	With magnesia ...	12·56

Reference to the above table shows that lime has a detrimental effect on sugar content. Magnesia, on the other hand, increases the sugar content, but this increase is somewhat limited in presence of lime.

Fertilizing value of crushed basalt

The 3×2×2 factorial experiment at Hermitage was harvested in 4th ratoons with the following results :—

	Tons Cane per arpent
0 B—No Basalt	33·7
1 B— 91 Tons Basalt per arpent	38·4
2 B—182 Tons Basalt per arpent	41 4
Significant difference (20:1)	± 1·7

The above figures show significant increases of 4.7 and 7.7 tons of cane due respectively to a single and a double dose of basalt applied at planting.

The following table gives the average responses to applications of basalt for the five crops :—

TONS CANE PER ARPENT

	0 B	1 B	2 B	*Response to 2 B*
Virgin crop ...	31·9	33·6	36·3	+ 4·4
1st Ratoons ...	26·7	29·8	32·6	+ 5·9
2nd Ratoons	32·4	34·2	37·3	+ 4·9
3rd Ratoons	33·0	36·2	38·1	+ 5·1
4th Ratoons	33·7	38·4	41·4	+ 7·7
Total for 5 crops	157·7	172·2	185·7	+28·0

The above figures show a total gain of 28 tons of cane for 5 crops due to one application of basalt at planting, or an average gain of nearly 6 tons per crop on soils where the average cane yield is over 30 tons per arpent. It is reasonable to suppose that less fertile soils would give still more spectacular results. It may be inferred from the trend of results that a response to basalt may safely be expected for many years to come ; it is also not unlikely that poorer soils might benefit to the same extent from a smaller application of basalt. Consequently it is possible that the application of basalt to the poor leached soils of the superhumid zones, in spite of the high cost of application of the basalt, might in the long run prove economical.

Other Investigations

FERTILIZER PLACEMENT

A few phosphate placement experiments have been undertaken on soils where phosphate deficiencies exist. These experiments have been carried out mostly on ratoons, because it is more difficult to make up for a phosphate deficiency in ratoons than in plant cane. The treatments included :—

1. Surface application i.e. on the cane stool.
2. Subsurface application, after removal of the soil around the cane stool, followed by a light earthing up.
3. Subsurface application, in a deep hole close to the cane stool.
4. Surface application under the straw in every alternate interline.

The last treatment was included on account of the profusion of roots which are usually found near the surface in the interline which is kept covered by the trash.

This treatment was also tested in three other experiments with nitrogenous fertilizers. These experiments are in progress and no information is, as yet, available.

Experiments with Plaine Lauzun type of Soil

The Plaine Lauzun type of soil covers an area as large as 19,000 acres on the coastal leeward side of the island. This dark grey soil is characterized by a compact structure, poor drainage and its sticky clay which renders the soil plastic when wet and makes it crack badly on drying. It is thus not well suited to cane cultivation.

Preliminary pot culture experiments were carried out with this soil type and the following treatments were applied to the pots :—

(1) Basalt at 200 tons per arpent

(2) Sand at 6 tons per arpent

(3) Lime at 3 tons per arpent

(4) Lime at 6 tons per arpent

The pots were planted with oats seeds and the seedlings were subsequently thinned to an equal number per pot. The treatments were replicated six times.

The green weight of the aerial parts are given below as a percentage of the control :—

Control	100
Basalt	132
Sand	118
Lime at 3 tons per arpent	122
Lime at 6 tons per arpent	138

These pot culture experiments, having given encouraging results, led to the establishment of a field trial at Magenta in Black River, where a large area of this soil type is being put under cane.

This experiment consist of a $2 \times 2 \times 2$ factorial design replicated four times. The treatments include Lime, Sand and Molasses and every combination of the three treatments at two levels each. It is unfortunate that basalt could not be introduced in the experiment as a further treatment.

This experiment is in progress and results will be available next year.

S. M. Feillafé,

15th February, 1953. *Acting Chemist S.R.S.*

PART III—BOTANY DIVISION

Weed Control

With the resumption of duty of the present writer in August a series of experiments were laid down this year. These were planned out with a view to investigating the following aspects of the problem :—

1. The respective effects of sodium 2 methyl 4 chloro phenoxy-acetate (Methoxone), sodium 2, 4—dichlorophenoxyacetate and other 2,4—D derivatives on the growth-rate, sucrose content and yield of sugarcane.

2. The gallonnage-weed-kill relationship of certain hormone types of weed killers under field conditions.

3. The most suitable, pre and post emergence methods applicable to the humid and sub-humid localities of the island.

4. The use of sodium chlorate as a method of control in localities where the weed population is dominantly graminaceous.

The experiments are in progress and no information is, as yet, available.

Investigations on the so-called resistant weed species have also been continued and, in that respect, it may be noted that encouraging results have been obtained in the use of sodium trichloracetate in the control of alang-alang grass *(Imperata cylindrica)* and chiendent *(Cynodon Dactylon)*

Pre-treatment of sugarcane cuttings

Four trials were established with a view to testing the efficacy of two new sugarcane disinfectants relatively to Aretan. The experiments planned out on the randomised system of replication were laid down at Réduit, Plaines Wilhems and Pamplemousses Experimental Stations. The Plant Pathology Division has been responsible for the assessment of pineapple disease incidence.

The results obtained are summarised below :—

TABLE I

Locality	*Treatments*	*No. of germinated cuttings Max. No. 180*	*Total length of shoot in cms/plot*	*No. of cutting infected with pineapple disease Max. No. 180*
Réduit : Experimental Station	Control ...	134	743	30
	R 1412×187—1% ...	166	884	5
	Aretan—1% ...	166	1013	3
Plaines Wilhems : Experimental Station	Control ...	156	1388	24
	R 1412×187—1% ...	159	1479	7
	Aretan—1% ...	170	1447	7
Pamplemousses : Experimental Station	Control ...	83	440	124
	R 1412×187—1% ...	164	1031	60
	Aretan—1% ...	159	1060	61
Mean of the 3 trials	Control ...	124	857	59
	R 1412×187—1% ...	163	1131	24
	Aretan—1% ...	165	1173	24

TABLE II

Locality	*Treatments*	*No. of germinated cuttings Max. No. 105*	*Total length of shoot in cms plot*	*No. of cuttings infected with pineapple disease Max. No. 105*
Réduit : Experimental Station	Control	82	226	52
	Solusanigran $^1/_{1000}$ instantaneous dipping ...	93	384	35
	Aretan 1% instantaneous dipping	99	431	14
	Solusanigran $^1/_{1000}$ 5 minutes dipping ...	105	503	7
	Aretan $^1/_{1000}$ 5 minutes dipping	100	403	4

The following are the main observations which emerge from the above data :—

Table I :—

1. R 1412 × 187 and Aretan gave comparatively similar results in their use as sugarcane disinfectants.
2. Both treatments were found more effective in the dry locality of Pamplemousses.

Table II :—

1. All treatments were found effective as sugarcane disinfectants.
2. With instantaneous dipping, Aretan at the higher concentration was more effective than Solusanigran at the lower concentration.
3. Solusanigran, with 5 minutes dipping, proved more effective than than the Aretan treatment at the same concentration in the promoting of shoot-length but was relatively less so, in the controlling of pine apple disease incidence.

Further data are required before it is possible to assess the value of Solusanigram as a sugarcane disinfectant.

Root Pruning as a test to Clemora Smithi Resistance

Root pruning tests were continued this year on the same lines as in previous years. The Barbados and Ebene 1/37 varieties were tested relatively to M. 134/32 in the third ratoon category.

The results of the experiments are shown hereunder :—

TABLE I

Locality	*Variety*	*Average No of new roots per cane*			
		Before pruning	*After 1st pruning*	*After 2nd pruning*	*After 1st and 2nd prunings*
Trianon	M. 134/32 ...	7	16	33	49
	B. 3337 ...	3	11	19	30
	B. 34104 ...	1	5	8	13
	B. 37161 ...	7	7	4	11
	B. 37172 ...	5	12	17	29
Colmar	M. 134/32 ...	7	29	27	56
	B. 3337 ...	10	3	23	26
	B. 34104 ...	6	0	3	3
	B. 37161 ...	11	3	5	8
	B. 37172 ...	9	13	23	36
Mean of the 2 trials	M. 134/32 ...	7	23	30	53
	B. 3337 ...	7	7	21	28
	B. 34104 ...	4	3	6	9
	B. 37161 ...	9	5	5	10
	B. 37172 ...	7	13	20	33

TABLE II

Locality	Variety	Average No. of white roots per cane: Before pruning	After 1st pruning	After 2nd pruning	After 1st and 2nd prunings
Hermitage	M. 134 32 ...	10	26	7	33
	Ebene 1/37 ...	6	10	14	24

The above figures show that M. 134/32 in more resistant than the Barbados and Ebene 1/37 varieties to the eating action of the grubs of *Clemora Smithi*. Again, this year, in the Barbados varieties B. 3337 and B. 37172 were found more resistant than B. 37161 and B. 34104 in that ratoon category.

Investigations on yield effets of interplanting foodcrops with sugarcane

The three trials laid down in 1950 were harvested this year in first ratoon.

Of the 13 new experiments planted in 1951 only 5 were harvested, the others having been harvested by the estates themselves without the plot yields being recorded. The data obtained from these five trials have not been found worthy of computation.

The results obtained in 1951 are given below :—

BRITANNIA S.E.

Time of harvesting (*a*) Virgin canes : August 1951
(*b*) Ratoon canes : August 1952

Sugarcane variety : M. 134/32
Foodcrop interplanted : Maize

Treatment	Tons cane per arpent: Virgins	First Ratoons
1. Sugarcane alone	44.6	33.2
2. Sugarcane with maize in alternate interlines planted immediately ...	47.4	35.6
3. Sugarcane with maize in every third line planted immediately ...	44.4	33.5
4. Sugarcane with maize in alternate interlines planted 15 days after ...	51.0	39.1
5. Sugarcane with maize in every third line planted 15 days after ...	41.2	38.0
Significant difference (P=0.05) ...	± 2 2	± 5.6

PLAINES WILHEMS EXPERIMENTAL STATION—TRIAL NO. 1

Time of harvesting (*a*) Virgins : October 1951
(*b*) Ratoon canes : September 1952

Sugarcane variety : M. 134/32
Foodcrop interplanted : Maize

Treatment	Tons cane per arpent: Virgins	First Ratoons
1. Sugarcane alone	19·9	30·9
2. Sugarcane with maize in alternate interlines planted immediately...	19 4	33·2
3. Sugarcane with maize in alternate interlines planted 15 days after	19·8	33·5
4. Sugarcane with maize in alternate interlines planted one month after	19·0	33·2
Significant difference (P=0·05) ...	± 3·4	± 4·0

PLAINES WILHEMS EXPERIMENTAL STATION (Trial No. 2)

Time of harvesting *(a)* Virgins : August 1951
(b) Ratoon canes : August 1952

Sugarcane Variety : M. 134/32

Foodcrops interplanted : Dholl Kessari, Potatoes.

Treatment	*Tons cane per arpent*	
	Virgins	*First Ratoons*
1. Sugarcane alone	31·7	29·3
2. Sugarcane with potatoes in alternate interlines	33·7	31·0
3. Sugarcane with dholl Kassari in alternate interlines	31·4	28·4
4. Sugarcane with dholl Kessari in one interline and potatoes in the other	35·6	32·3
Significant difference (P=0·05) ...	± 6·5	± 5·1

From the above figures it may be inferred that there is no effect on cane yield in First ratoons. The results obtained this year are in accord with those of last year in the same ratoon category.

E. ROCHECOUSTE.
Acting Botanist.

10th February, 1953.

PART IV—EXTENSION SERVICE DIVISION

Activities

The activities of the Extension Service have been curtailed to a certain extent on account of the reduced staff. However it has been possible for the officers to keep in touch with the various groups of small planters throughout the Island and extend the propaganda work already started.

A noteable progress may be observed in the cultural methods of small planters and, as last year, the success of small planters who had followed the advice of the Sugarcane Research Station has contributed to a great extent to this achievement. In one particular case for instance a fairly big planter, following our advice, has obtained 4 tons of cane per arpent more than in 1951 while most planters of the same region have suffered decreases of 2 to 4 tons per arpent ; in addition the sucrose content of his canes was the highest of the locality.

1. Demonstration Plots

A. Artificial Fertilizers

It has been possible to harvest and weigh 30 plots during last crop. The results have revealed a bigger response to phosphate than to potash, as was the case in 1951. However, on the average, the fertilizer treatment advocated by the S.R.S. has produced an increase in yield of about 4 tons of cane per arpent as compared with normal small planters' treatment. The effect of the S.R.S. treatment on the sucrose content of the cane has not been determined in each case but, as already mentioned, planters who have adopted this treatment have obtained appreciably more sugar from their respective factories than those who have maintained their routine fertilizer programme, viz : Nitrogenous artificials + farmyard manure.

15 new plots have been established during the year.

B. Different Sugarcane Varieties

Only three trials including the varieties M. 134/32, M. 423/41 and Ebene 1/37 were harvested and weighed during the period under review. In two cases M. 423/41 proved much better than the two other varieties, Ebene 1/37 being the second best. In the third plot Ebene 1/37 and M. 423/41 were equally good, M. 134/32 being slightly inferior.

In view of the comparatively low sucrose content of the M. 423/41, as determined on several occasions by various millers as well as in the S.R.S. laboratory, it was not considered advisable to lay down any new demonstration plot with this variety.

The very erratic growth of Ebene 1/37 as observed in various estate plantations seems to indicate that small planters should be cautious in propagating this variety. In consequence it has been considered advisable not to include the variety in any new demonstration plot before the causes of its abnormal growth can be determined and controlled. No other new variety having been released for commercial cultivation, no variety demonstration plot was laid down during the last planting season.

C. Fungicides

During the planting season, the Field Demonstrators carry with them the necessary equipment for demonstrating the beneficial effects of fungicides. Whenever they find small planters not treating their planting material with fungicides, they immediately make a demonstration in this connection. About 60 such demonstrations have been carried out.

It may be safely stated that about 50 per cent of the small planters are now using fungicides for their new plantations.

D. Chemical Weed Control

Planters have been showing a growing interest in chemical weed control and a large number of them have been applying to the Extension Service for information in this connection. Following these requests, 75 demonstrations have been carried out, using the standard 2,4 D-weed killers and also, in some special cases, sodium chlorate.

Many of the bigger planters have now obtained the necessary equipment for chemical weed control.

The attention of planters has been specially drawn to the precautions necessary when handling volatile chemicals and to the dangers of an improper use of weed killers in general.

II. Small Planters' Meetings

The meetings organised by the Field Demonstrators seem to have met with more success this year than in 1951 : the average attendance has been 30 as compared with 20 in 1951. However the total number of meetings has been reduced on account of the shortage of staff.

As usual, all the problems connected with sugarcane cultivation were dealt with during the talks but, as mentioned above, planters were particularly interested in chemical weed control, in view especially of the daily increasing cost of labour.

75 meetings were organised during the year.

III. Soil Erosion

In spite of the appreciable efforts made by many small planters in order to reduce soil erosion, the new plantations on the sloping lands of Savanne, Grand Port and Long Mountain have suffered serious damages during the heavy rains in December. Special consideration will be given to this problem in future.

IV. Foliar Diagnosis

In spite of the care taken in the handling of the leaf samples from small planters' fields, the data obtained have revealed a general shortage of nitrogen.

Phosphate and potash deficiencies have also been found in most cases. This may be explained by the fact that most small planters and many bigger ones are still not making full use of the fertilizers available and are usually very late in applying them to their fields. Very few of them for instance are in favour of an early application of the maximum amount of potash available.

V. Sugarcane Varieties Grown by Small Planters

The situation has improved considerably as far as the cultivation of prohibited varieties is concerned. As far as it has been possible to ascertain there has been no serious trouble in this connection between small planters and millers.

The variety Ebene 1/37 has been propagated to a fair extent by small planters in the higher rainfall regions. It is doing very well in general but does not cover the ground well and requires more frequent weedings.

VI. Miscellaneous Activities

(1) The Extension Service has, as in the past years, afforded facilities to small planters in enabling them to obtain fungicides and chemical weed killers in small quantities according to their requirements. Whenever possible sprayers have been lent to the small planters who could not avail themselves of the necessary equipment.

(2) The officers of the Extension Service have contributed to some extent to the research work in chemical weed control and have helped other Divisions of the Sugarcane Research Station in harvesting their field trials.

(3) The Extension Service has been responsible for the carrying out of 35 inquiries on behalf of the Officer-in-charge of the distribution of artificials.

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The writer wishes to thank all his colleagues for their valuable co-operation throughout the period under review.

G. MAZERY,
Senior Field Demonstrator.

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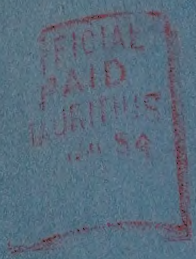
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